2.3.12. Blind Ranges

2.3.12.1. Purpose

The purpose of this test is to find any blind ranges within the detection envelope of the radar and then to evaluate the effect that these blind ranges have upon intercept tactics.

2.3.12.2. General

In some pulsed radars, the PRF is increased beyond the limit where the maximum unambiguous range is less than the maximum detection range. This is done to increase the average power of the radar. The ambiguity can be resolved in a number of ways, as discussed in the radar theory section. A side effect of these techniques is the generation of range blocks where detection is lost. These blind range blocks are usually small and sometimes unnoticeable. It is still worthwhile to check for them. The problem is compounded for VS modes since the transmit pulses, and thus blind range blocks, tend to be very long. The effect is minimized through techniques like staggering the PRF on a pulse to pulse basis to move the blind range in a correspondingly staggered fashion and prevent long, multiple scan drop-outs. If the blind ranges are wide, they can cause the pilot to commit on an intercept and then to lose contact at critical ranges, allowing the target to optimize his own intercept while the test radar is without detection or "in the blind".

2.3.12.3. Instrumentation

Data cards and an optional voice recorder are required for this test.

2.3.12.4. Data Required

Following the maximum detection range data point, note whenever the target is lost and then reacquired.

2.3.12.5. Procedure

Perform a maximum detection range test. After the initial PD=0.5 data point, maintain a search mode with a medium to narrow scan pattern, single bar and the minimum range scale able to maintain radar contact. Ensure that the antenna elevation is centered on the target altitude at the target range. Monitor the detection from scan to scan and note, using the radar and air-to-air TACAN, the ranges where detection is lost and then, the range where it is regained. Repeat this test as many times as possible during the course of the flight. During mission relatable intercepts, note any detection drop-outs and their effects upon intercept tactics.

2.3.12.6. Data Analysis and Presentation

Detection drop-outs are not uncommon and will probably never be completely eliminated. For this reason, more than one run will be required to establish a pattern of blind ranges. Two problems should be looked for. Qualitatively, the detection level should be adequate to provide good SA to the operator throughout the intercept. Relate the width and number of drop-outs to their effects upon intercept tactics. Staggered PRFs and/or PWs will cause the drop-outs to occur randomly and can only be assessed quantitatively with extensive instrumentation. An analysis of the manufacturer's technical material will tell whether a staggered PRF and/or PW scheme is used. When the radar parameters are constant, the blind ranges will be fairly repeatable and even with other random drop-outs, will be seen by plotting the detection dropouts on a detection versus range plot. Consistent misses will occur at the same beginning and end points with the random dropouts scattered over the rest of the detection volume. The random drop-outs will be more prevalent at the longer ranges, where detection is more difficult. Relate the width and ranges of the blind ranges to their effects upon intercept tactics. Try to relate them to specific critical weapon ranges such as maximum launch and optimum launch ranges and also to the weapons parameters of the threat.

2.3.12.7. Data Cards

A sample data card is provided as card 16.

CARD NUMBER ___ TIME ____ PRIORITY L/M/H

BLIND RANGES

[PERFORM A MAXIMUM DETECTION RANGE TEST. USE A SEARCH MODE, MEDIUM TO NARROW SCAN PATTERN, SINGLE BAR, AND THE LOWEST RANGE SCALE TO COVER THE TARGET. AFTER THE PD=0.5 POINT IS TAKEN, CONTINUE INBOUND TO FLY-THROUGH. NOTE RADAR AND AIR-TO-AIR TACAN RANGES WHEN THE RADAR DETECTION IS LOST AND THEN WHEN REGAINED.]

RADAR MODE	LOST/REGAINED (L/R)	RADAR RANGE (L/R)	TACAN RANGE (L/R)

[EVALUATE THE EFFECTS OF DETECTION DROP-OUTS DURING MISSION RELATABLE INTERCEPTS.]

EFFECTS:

Card 16: Blind Ranges Data Card